# William D. Gropp

Assoicate Division Director and
Senior Computer Scientist
Mathematics and Computer Science Division
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## Date of Birth: 23 September 1955

## Education:

Stanford University, Stanford, CA
    Ph.D. in Computer Science (January 1982)
    M.S. in Computer Science (June 1980)

University of Washington, Seattle, WA
    M.S. in Physics (June 1978)

Case Western Reserve University, Cleveland, OH
    B.S. in Mathematics (May 1977)

## Professional Experience:

Argonne National Laboratory
    Associate Division Director
    March 2000 to present
    Senior Computer Scientist
    March 1996 to present

    Computer Scientist
    March 1990 to March 1996

    Deputy Scientific Director of the High-Performance Computing Research Facility
    September 1990 to April 1997

Yale University
    Associate Professor of Computer Science
    July 1988 to February 1990

    Assistant Professor of Computer Science
    January 1982 to July 1988

## Awards and Honors:

Gordon Bell Prize, 1999, with Anderson, Kaushik, Keyes, and Smith
Beale-Orchard-Hays Honorable Mention, 2000, with Jorge Moré

**Recent Professional Activities:**

Conference Technical Program Chair:
      IEEE Cluster 2002
Conference Committees:
      IEEE Cluster 2003, IWIA03, EuroPVMMPI, SC2002, ISHPC02, WIMPS02
Series editor:
      MIT Press Scientific and Engineering Computation
Editorial boards:
      Concurrency and Computation
      International Journal of High Performance Computing Applications
Gordon Bell Prize Committee:
      Member (2002), Chair (2003)
Membership in professional societies:
      SIAM, ACM, IEEE

# 1 Books

[1] William Gropp, Ewing Lusk, and Anthony Skjellum. *Using MPI: Portable Parallel Programming with the Message-Passing Interface.* MIT Press, Cambridge, MA, 1994.

[2] B. F. Smith, P. E. Bjørstad, and W. D. Gropp. *Domain Decomposition: Parallel Multilevel Methods for Elliptic Partial Differential Equations.* Cambridge University Press, New York, 1996.

[3] William Gropp, Steven Huss-Lederman, Andrew Lumsdaine, Ewing Lusk, Bill Nitzberg, William Saphir, and Marc Snir. *MPI - The Complete Reference: Volume 2, The MPI-2 Extensions.* MIT Press, Cambridge, MA, USA, 1998.

[4] William Gropp, Ewing Lusk, and Anthony Skjellum. *Using MPI: Portable Parallel Programming with the Message Passing Interface,* 2nd edition. MIT Press, Cambridge, MA, 1999.

[5] William Gropp, Ewing Lusk, and Rajeev Thakur. *Using MPI-2: Advanced Features of the Message-Passing Interface.* MIT Press, Cambridge, MA, 1999.

[6] Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, editors. *Sourcebook of Parallel Computing.* Morgan Kaufmann, 2003.

# 2 Journal Articles

[1] William D. Gropp. A test of moving mesh refinement for 2-D scalar hyperbolic problems. *SIAM Journal on Scientific and Statistical Computing*, 1(2):191–197, June 1980.

[2] William D. Gropp. Solving PDEs on loosely-coupled parallel processors. *Parallel Computing*, 5(1-2):165–173, July 1987. Proceedings of the international conference on vector and parallel computing—issues in applied research and development (Loen, 1986).

[3] David E. Keyes and William D. Gropp. A comparison of domain decomposition techniques for elliptic partial differential equations and their parallel implementation. *SIAM Journal on Scientific and Statistical Computing*, 8(2):S166–S202, March 1987. Reprinted in Selected Papers from the Second Conference on Parallel Processing for Scientific Computing (C. W. Gear & R. G. Voigt, eds., SIAM, 1987).

[4] William D. Gropp. Local uniform mesh refinement with moving grids. *SIAM Journal on Scientific and Statistical Computing*, 8(3):292–304, May 1987.

[5] W. Gropp. Local uniform mesh refinement on loosely-coupled parallel processors. *I. J. Comp. Math. Appl.*, 15:375–389, 1988.

[6] William D. Gropp and David E. Keyes. Complexity of parallel implementation of domain decomposition techniques for elliptic partial differential equations. *SIAM Journal on Scientific and Statistical Computing*, 9(2):312–326, March 1988.

[7] William D. Gropp and I. C. F. Ipsen. Recursive mesh refinement on hypercubes. *Nordisk Tidskr. Informationsbehandling (BIT)*, 29:186–211, 1989.

[8] William D. Gropp and David E. Keyes. Domain decomposition on parallel computers. *Impact Comput. Sci. Eng.*, 1:421–439, 1989.

[9] David E. Keyes and William D. Gropp. Domain decomposition techniques for the parallel solution of nonsymmetric systems of elliptic boundary value problems. *Applied Numerical Mathematics: Transactions of IMACS*, 6(4):281–301, May 1990.

[10] H. Berryman, J. Saltz, W. Gropp, and R. Mirchandaney. Krylov methods preconditioned with incompletely factored matrices on the CM-2. *Journal of Parallel and Distributed Computing*, 8(2):186–190, February 1990.

[11] Leslie Greengard and William D. Gropp. A parallel version of the fast multipole method. *Computers and Mathematics with Applications*, 20:63–71, 1990.

[12] William D. Gropp and Edward Smith. Computational fluid dynamics on parallel processors. *Computers and Fluids*, 18:289–304, 1990.

[13] Xiao-Chuan Cai, William D. Gropp, and David E. Keyes. Convergence rate estimate for a domain decomposition method. *Numerische Mathematik*, 61(2):153–169, 1992.

[14] W. D. Gropp and D. E. Keyes. Domain decomposition with local mesh refinement. *SIAM J. Sci. Stat. Comput.*, 13:967–993, 1992.

[15] W. D. Gropp and D. E. Keyes. Parallel performance of domain-decomposed preconditioned Krylov methods for PDEs with locally uniform refinement. *SIAM Journal on Scientific and Statistical Computing*, 13:128–145, 1992.

[16] W. D. Gropp and D. E. Keyes. Domain decomposition methods in computational fluid dynamics. *Int. J. Numer. Meth. Fluids*, 14:147–165, 1992.

[17] I. Foster, W. Gropp, and R. Stevens. The parallel scalability of the spectral transform method. *Monthly Weather Review*, 120(5):835–850, 1992.

[18] Xiao-Chuan Cai, William D. Gropp, and David E. Keyes. A comparison of some domain decomposition and *ILU* preconditioned iterative methods for nonsymmetric elliptic problems. *Numerical linear algebra with applications*, 1(5):477–504, 1994.

[19] Message Passing Interface Forum. MPI: A message passing interface standard. *International Journal of Supercomputer Applications*, 8(3/4):159–416, 1994.

[20] K. Forsman, W. Gropp, L. Kettunen, D. Levine, and J. Salonen. Solution of dense systems of linear equations arising from integral equation formulations. *IEEE Antennas and Propagation Magazine*, pages 96–100, December 1995.

[21] W. D. Gropp and E. Lusk. Experiences with the IBM SP1. *IBM Systems Journal*, 34(2):249–262, 1995.

[22] Anthony Skjellum, Ewing Lusk, and William Gropp. Early applications in the Message-Passing Interface (MPI). *International Journal of Supercomputer Applications and High Performance Computing*, 9(2):79–94, Summer 1995.

[23] William D. Gropp, Hans Kaper, G. Leaf, D. Levine, V. Vinokur, and M. Palumbo. Numerical simulation of vortex dynamics in high-$t_c$ superconductors. *J. Comp. Physics*, 123:254–266, 1996.

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[25] R. Thakur, W. Gropp, and E. Lusk. An experimental evaluation of the parallel I/O systems of the IBM SP and Intel Paragon using a production application. *Lecture Notes in Computer Science*, 1127, 1996.

[26] Barry Smith and William Gropp. The design of data-structure-neutral libraries for the iterative solution of sparse linear systems. *Scientific Programming*, 5:329–336, 1996.

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[28] W. Gropp and E. Lusk. Sowing MPICH: A case study in the dissemination of a portable environment for parallel scientific computing. *The International Journal of Supercomputer Applications and High Performance Computing*, 11(2):103–114, Summer 1997.

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[30] Rajeev Thakur, Ewing Lusk, and William Gropp. I/O in parallel applications: The weakest link. *The International Journal of High Performance Computer Applications*, 12(4, part 2):389–395, 1998.

[31] X-C Cai, William D. Gropp, David E. Keyes, R. G. Melvin, and D. P. Young. Parallel Newton-Krylov-Schwarz algorithms for the transonic full potential equation. *SIAM Journal of Scientific Computing*, 19:246–265, January 1998. Also ICASE report TR 96-39.

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[34] David Levine, William Gropp, Kimmo Forsman, and Lauri Kettunen. Parallel computation of three-dimensional nonlinear magnetostatic problems. *Concurrency Practice and Experience*, 11(2):109–120, February 1999.

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[36] William Gropp, David E. Keyes, Lois C. McInnes, and M. D. Tidriri. Globalized Newton-Krylov-Schwarz algorithms and software for parallel implicit CFD. *High Performance Computing Applications*, 14(2):102–136, 2000.

[37] W. D. Gropp, D. K. Kaushik, D. E. Keyes, and B. F. Smith. High performance parallel implicit CFD. *Parallel Computing*, 27:337–362, 2001.

[38] Ralph Butler, William Gropp, and Ewing Lusk. Components and interfaces of a process management system for parallel programs. *Parallel Computing*, 27(11):1417–1429, October 2001.

[39] Rajeev Thakur, William Gropp, and Ewing Lusk. Optimizing noncontiguous accesses in MPI-IO. *Parallel Computing*, 28(1):83–105, January 2002.

[40] Mark Baker, Daniel Katz, William Gropp, and Thomas Sterling. Special issue: Cluster 2001. *Concurrency and Computation: Practice and Experience*, 15(7–8):623–624, 2003.

[41] William D. Gropp and Ewing Lusk. Fault tolerance in MPI programs. *International Journal of High Performance Computer Applications*, 2004. To appear in Fall 2004.

# 3   Proceedings

[1] D. L. Boley, William D. Gropp, and M. M. Theimer. A method for constructing preprocessors. In *Conference on the Computing Environment for Mathematical Software*. JPL and ACM-SIGNUM, July 1981. JPL Publication 81-67.

[2] W. D. Gropp. Numerical linerar algebra on workstations. In *Proc. Army Research Office Workshop on Microcomputers in Scientific Computing*, 1985.

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[4] William D. Gropp. Local uniform mesh refinement on parallel processors. In P. Deuflhard and B. Enquist, editors, *Large Scale Scientific Computing*, Boston, 1987. Birkhäuser.

[5] William D. Gropp. Adaptive methods for hyperbolic problems on local memory parallel processors. In M. H. Schultz, editor, *Numerical Algorithms for Modern Computer Architectures*, New York, 1988. Springer-Verlag.

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[8] William D. Gropp and David Foulser. Clam: A programming language for interactive supercomputing and visualization. In *Proceedings of the Fourth International Conference on Supercomputing, Santa Clara, California*, 1989.

[9] William D. Gropp. Dynamic grid manipulation for PDEs on hypercube parallel processors. In A. Wouk, editor, *Parallel Processing and Medium Scale Multiprocessing*, Philadelphia, 1989. SIAM.

[10] Leslie Greengard and William D. Gropp. A parallel version of the fast multipole method. In Gary Rodrigue, editor, *Proceedings of the 3rd Conference on Parallel Processing for Scientific Computing*, pages 213–222, Philadelphia, PA, USA, December 1989. SIAM Publishers.

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[23] Xiao-Chuan Cai, William D. Gropp, and David E. Keyes. A comparison of some domain decomposition algorithms for nonsymmetric elliptic problems. In Tony F. Chan, David E. Keyes, Gérard A. Meurant, Jeffrey S. Scroggs, and Robert G. Voigt, editors, *Fifth International Symposium on Domain Decomposition Methods for Partial Differential Equations*, Philadelphia, PA, USA, 1992. SIAM.

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[27] Ralph Butler, William D. Gropp, and Ewing Lusk. Developing applications for a heterogeneous computing environment. In *Proc. Workshop on Heterogeneous Processing*, pages 77–83, Los Alamitos, California, 1993. IEEE.

[28] William Gropp. Parallel programming tools for distributed-memory computers. In *Proc. of the 1993 SCS Simulation Multiconference*, March 1993.

[29] N. Galbreath, W. Gropp, D. Gunter, D. Leaf, and D. Levine. Parallel solution of the three-dimensional, time-dependent Ginzburg-Landau equation. In Linda R. Petzold, Richard F. Sincovec, David E. Keyes, Michael R. Leuze, and Daniel A. Reed, editors, *Proceedings of the 6th SIAM Conference on Parallel Processing for Scientific Computing*, pages 160–164, Norfolk, VI, March 1993. SIAM Press.

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